

# Jedidiah McClurg

## Curriculum Vitæ \*

✉ [jrmcclurg@gmail.com](mailto:jrmcclurg@gmail.com)  
🌐 <http://www.jrmcclurg.com>  
🎓 [scholar.jrmcclurg.com](http://scholar.jrmcclurg.com)  
📄 [dblp.jrmcclurg.com](http://dblp.jrmcclurg.com)  
💬 [skype:jedmcclurg](https://skype:jedmcclurg)  
🌐 [linkedin.jrmcclurg.com](http://linkedin.jrmcclurg.com)  
📖 [stackoverflow.jrmcclurg.com](http://stackoverflow.jrmcclurg.com)

### Executive Summary

- **Research:** My research focuses on synthesis/verification of software-defined network (SDN) programs, and my overall goal is to develop tools and techniques to help programmers write better code. I have (co-)authored 11 peer-reviewed papers since 2012, including first-author conference papers at top venues like **CAV'17**, **PLDI'16**, and **PLDI'15**. My total citation count is currently 100, with an h-index of 5 and i10-index of 3. I received an Outstanding Research Award from the CU Boulder CS Department in Spring 2017.
- **Teaching:** Since 2007, I have served as an undergraduate/graduate teaching assistant 8 times. I received an Outstanding Teaching Assistant Award from CU Boulder CS in Fall 2013.
- **Service:** I served as an Artifact Evaluation Committee (AEC) member for POPL'18 and '16, and wrote reviews for IEEE ToN (2017), ESOP'17, TACAS'16, ASE'14, and CAV'14.

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## Education

- 2013 – 2018 **Ph.D. Computer Science**, University of Colorado Boulder, Boulder, CO, USA.
  - Research Group: CUPLV (Programming Languages and Verification)
  - Topic: *Program Synthesis for Software-Defined Networking*
  - Advisor: Prof. Pavol Černý
- 2011 – 2013 **M.S. Computer Science**, Northwestern University, Evanston, IL, USA.
- 2004 – 2009 **B.S.E. Electrical & Computer Eng.**, University of Iowa, Iowa City, IA, USA.

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## Awards

Sep 2017	ARCS Scholarship, ARCS Foundation Colorado	\$6500
Apr 2017	Outstanding Research Award, CS Dept., CU Boulder	\$600
Apr 2014	Outstanding Teaching Assistant Award, CS Dept., CU Boulder	\$500
Oct 2013	Research Community Development (RCD) Award, CU Boulder	\$1850
Aug '13 – Jul '14	Dean's Fellowship, University of Colorado Boulder	\$5000
Aug '13 – Jul '14	University Fellowship, University of Colorado Boulder	\$1000
Sep '11 – Aug '12	Walter P. Murphy Fellowship, Northwestern University	\$16K + tuition
May 2011	Innovation Disclosure, Rockwell Collins Advanced Tech. Center	\$600
Aug '04 – May '08	Presidential Scholarship, University of Iowa	\$28K + tuition
Aug '04 – May '08	National Merit Scholarship, University of Iowa	\$9500

Aug 2004	National Merit Scholarship, Rockwell Collins	\$2500
Aug 2004	Engineering Excellence Scholarship, University of Iowa	\$1000

## Travel Grants

May 2016	Travel Grant, SIGPLAN, PLDI Conference	\$510
Feb 2016	CS/Dean's Travel Grant, University of Colorado Boulder	\$1300
Apr 2015	Travel Grant, NSF, PLDI/FCRC Conference	\$1028
Feb 2015	CS Travel Grant, University of Colorado Boulder	\$1000
Sep 2012	TGS Travel Grant, Northwestern University	\$500
Sep 2012	EECS Travel Grant, Northwestern University	\$300
May 2011	Travel Grant, NSF, Summer School on Formal Techniques at SRI	\$500

## Academic Experience

### University of Colorado Boulder, Boulder, CO, USA

- Jan '14 – present *Graduate Research Assistant.*  
Working on research related to program synthesis for SDN.
- Aug '13 – Dec '13 *Graduate Teaching Assistant.*  
Taught discussion section, created/graded exams, and held office hours for the *CSCI 3155 Principles of Programming Languages* class.

### Northwestern University, Evanston, IL, USA

- Sep '11 – Jun '13 *Graduate Research Assistant.*  
Worked on research related to PL for wireless Sensor Networks (WSN).
- Sep '12 – Mar '13 *Graduate Teaching Assistant.*  
Assisted with grading, office hours, etc. for *EECS 317 Data Management and Information Processing*, and *EECS 211 Fundamentals of Computer Programming II*.

### University of Iowa, Iowa City, IA, USA

- Jan '10 - Dec '10 *Graduate Research Assistant.*  
Added wireless functionality to an embedded glucose sensor device (ECE Dept.). Wrote proof checker generator software, and a Lustre code translator (CS Dept.).
- Jan '10 - May '10 *Graduate Teaching Assistant.*  
Provided general lab support and assisted the *055:089 EE Senior Design* class instructor with grading.
- Aug '07 – May '09 *Undergraduate Teaching Assistant, 3 semesters (Fall'07, Spring'08, Spring'09).*  
Provided instruction and assistance to students in the lab, maintained/updated lab equipment, and graded lab reports and homeworks for the *055:032 Digital Design* (introduction to digital logic) class.
- Jan '06 – May '07 *Undergraduate Research Assistant, 3 semesters (Spring'06, Fall'06, Spring'07).*  
Worked in the Dept. of Mathematics, designing and developing an interactive web-based Calculus learning tool for beginning undergraduates.

Jan '07 – May '07 *Undergraduate Teaching Assistant.*

Hosted weekly tutorial/discussion sessions with students, graded homeworks, wrote exam questions, and presented exam review sessions for the *059:006 Engineering Problem Solving II* (introduction to C programming) class.




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## Publications

### 📖 Conference Papers In Progress

- [12] Jedidiah McClurg, Nate Foster, and Pavol Cerny. Data-Plane Mechanisms for Distributed SDN Programming. 2017.

### 📖 Peer-reviewed Conference Papers

- CAV '17**  [11] Jedidiah McClurg, Hossein Hojjat, and Pavol Cerny. Synchronization Synthesis for Network Programs. In *the 29th Intl. Conference on Computer-Aided Verification*. Acceptance rate: **57 / 191 = 30%**. Heidelberg, Germany, 2017.
- FMCAD '16** [10] Hossein Hojjat, Philipp Ruemmer, Jedidiah McClurg, Pavol Cerny, and Nate Foster. Optimizing Horn Solvers for Network Repair. In *the 16th Intl. Conf. on Formal Methods in Computer-Aided Design*. Acceptance rate: **23 / 64 = 36%**. Mountain View, CA, USA, 2016.
- DISC '16** [9] Pavol Cerny, Nate Foster, Nilesh Jagnik, and Jedidiah McClurg. Optimal Consistent Network Updates in Polynomial Time. In *the 30th Intl. Symp. on Distrib. Computing*. Acceptance rate: **32 / 132 = 24%**. Paris, France, 2016.
- PLDI '16**  [8] Jedidiah McClurg, Hossein Hojjat, Nate Foster, and Pavol Cerny. Event-Driven Network Programming. In *the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation*. Acceptance rate: **49 / 304 = 16%**. Santa Barbara, CA, USA, 2016.
- SecureComm'15** [7] Vaibhav Rastogi, Zhengyang Qu, Jedidiah McClurg, Yinzhi Cao, and Yan Chen. Uranine: Real-time Privacy Leakage Monitoring without System Modification for Android. In *the 11th EAI Intl. Conf. on Security and Privacy in Communication Networks*. Acceptance rate: **30 / 108 = 28%**. Dallas, TX, USA, 2015.
- PLDI '15**  [6] Jedidiah McClurg, Hossein Hojjat, Pavol Cerny, and Nate Foster. Efficient Synthesis of Network Updates. In *the 36th ACM SIGPLAN Conf. on Programming Language Design and Implementation*. Acceptance rate: **58 / 303 = 19%**. Portland, OR, USA, 2015.
- ### 📖 Peer-reviewed Workshop/Demo Papers
- MobileDeLi '15** [5] J. Protzenko, S. Burckhardt, M. Moskal, and Jedidiah McClurg. Implementing Real-time Collaboration in TouchDevelop using AST Merges. In *the 3rd Intl. Workshop on Mobile Dev. Lifecycle*. Pittsburgh, PA, USA, 2015.

- PLVNET '15** [4] Hossein Hojjat, Jedidiah McClurg, Pavol Cerny, and Nate Foster. Network Updates for the Impatient: Eliminating Unnecessary Waits. In *the 1st Workshop on Programming Languages and Verification Technology for Networking*. Mumbai, India, 2015.
- ACL2 '14** [3] David S Hardin, Jennifer A Davis, David A Greve, and Jedidiah R McClurg. Development of a Translator from LLVM to ACL2. In *the 12th International Workshop on the ACL2 Theorem Prover*. Vienna, Austria, 2014.
- LAW '13** [2] Jennifer Davis, David Hardin, and Jedidiah McClurg. Creating Formally Verified Components for Layered Assurance with an LLVM-to-ACL2 Translator. In *the 7th Layered Assurance Workshop*. New Orleans, LA, USA, 2013.
- Sensys '12** [1] Jedidiah McClurg, Goce Trajcevski, and Jesse Yanutola. Demo Abstract: Collaborative Reactive Behavior in Heterogeneous Wireless Sensor Networks. In *the 10th ACM Conference on Embedded Networked Sensor Systems*. Toronto, ON, Canada, 2012.

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## Talks

- Jul 27, 2017 CAV 2017  
 Jun 30, 2017 CU Boulder, CUPLV Group
 

**• Synchronization Synthesis for Network Programs**  
*Heidelberg, Germany*  
*Boulder, CO, USA*
- Jun 16, 2016 PLDI 2016  
 May 27, 2016 CU Boulder, CUPLV Group
 

**• Event-Driven Network Programming**  
*Santa Barbara, CA, USA*  
*Boulder, CO, USA*
- Jun 16, 2015 PLDI 2015  
 Jun 5, 2015 CU Boulder, CUPLV Group  
 Mar 6, 2015 (with Pavol Černý) CU Boulder, NGN Group
 

**• Efficient Synthesis of Network Updates**  
*Portland, OR, USA*  
*Boulder, CO, USA*  
*Boulder, CO, USA*
- June 25, 2014 Microsoft Research, RiSE Group
 

**• AST-based Collaborative Editing**  
*Redmond, WA, USA*
- Aug 8, 2013 Rockwell Collins, Advanced Technology Center
 

**• Reasoning About LLVM Assembly Code via .LL-to-ACL2 Translation**  
*Cedar Rapids, IA, USA*
- May 30, 2012 Northwestern EECS 441 Class Final Presentation
 

**• Virtual Machine Support for Parallel Language Runtimes**  
*Evanston, IL, USA*
- May 28, 2012 (with J. Friedman and W. Ng) Northwestern EECS 450
 

**• Detecting Android Privacy Leaks via Dynamic Taint Analysis**  
*Evanston, IL, USA*
- Jun 14, 2011 (with Lucas Wagner) AFRL S5 Symposium
 

**• Industrial Verification Using the KIND Model Checker**  
*Dayton, OH, USA*

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## Academic Service

- **Artifact Evaluation Committee (AEC) Member:** POPL '18, POPL '16
- **Reviewer:** IEEE Transactions on Networking (ToN) '17, ESOP '17, TACAS '16, CAV '14, ASE '14

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## Skills

desktop environments	Ubuntu (Linux), Solaris, Windows, Cygwin
embedded platforms	Android, SunSPOT, TelosB, Microchip, Freescale
programming langs.	OCaml, Scala, Java, C, C++, Perl, Python, SML, Racket
formal verification	Z3, Yices, SPIN, NuSMV, MiniSat, ACL2, HOL, Lustre, Alloy
compiler construction	Xtext, OCamlLex/Yacc, LLVM, X86
hardware design	VHDL, Verilog, Xilinx, PSpice, I <sup>2</sup> C, SPI, SD/MMC, USB
networking	nesC, TinyOS, Sockets, TCP/IP, ZigBee (802.15)
web development	PHP, MySQL, HTML, CSS, JavaScript, Apache, JSP, Tomcat
mathematical tools	Mathematica, MATLAB, L <sup>A</sup> T <sub>E</sub> X, Gnuplot

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## Professional Experience

### **Microsoft Research**, Redmond, WA, USA

Mar '14 – Jun '14 *Research Intern.*  
Worked in the RiSE group, building support for realtime collaborative code-editing into the TouchDevelop project.

### **Rockwell Collins**, Cedar Rapids, IA, USA

Jun '13 – Aug '13 *Graduate Intern.*  
Worked in the Advanced Technology Center building a translator from LLVM assembly code into ACL2 to facilitate reasoning about binaries.

Jan '11 – Aug '11 *Graduate Intern.*  
Worked in the Advanced Technology Center developing and using verification tools in an avionics context.

Nov '09 – Jun '10 *Graduate Co-op.*  
Worked in the SATCOM department developing test software for a military satellite terminal waveform and writing various scripts and documentation.

Sep '08 – Dec '08 *Engineering Co-op.*  
Worked in the Panels department designing hardware/software for commercial airliner cockpit panels and designing/configuring panel test equipment.

Jun '04 – Aug '04 *Technical Intern.*  
Worked in the Advanced Technology Center developing GUI frontends related to testing and benchmarking of a software-defined radio.

### **aJile Systems**, Cedar Rapids, IA, USA

June 2002 - August 2002 *Technical Intern.*  
Developed benchmark applications for a JAVA bytecode processor.

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## Miscellaneous

memberships Association for Computing Machinery (ACM)  
citizenship United States  
relationship status married (spouse is self-employed in the apparel design industry)  
Erdős number  $\leq 4$   
typing speed 80 wpm  
StackOverflow level 3500+ reputation, 19 badges (member since Aug 2012)  
AskUbuntu level 450+ reputation, 7 badges (member since Aug 2012)  
hobbies hiking, rock climbing, unicycling

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## References

Professional references available on request